Meteorological Conditions During Solar Observations, Blue Hill Meteorological Observatory, June 1937

Date	Time from local noon	Temperature °C	Wind Beaufort	Visibility	Sky blue	Haze[1]	Cloudiness and remarks
June 4	0:32 a. m.	20.0	WSW 3	7	8	1	6 Cu.
7	0:19 a. m.	22.8	ENE 3	6	7	2	8 Cu.
7	1:28 p. m.	23.1	NE 2	6	7	2	3 Cu.
7	2:43 p. m.	24.4	NE 2	6	7	2	1 Ac, 1 Cunb.
9	5:05 a. m.	16.7	SW 4	8	8	0	Zero clouds.
9[2]	2:07 a. m.	22.8	SW 3	7	8	1	Zero clouds.
9	1:45 a. m.	22.8	SW 3	7	8	1	Zero clouds.
9[2]	0:26 a. m.	25.0	SSW 3	7	8	1	Few Cu.
9	0:04 a. m.	25.6	SSW 3	7	8	1	Few Ci., 1 Cu.
12	3:49 a. m.	18.9	NW 2	7	8	0	Few Cu.
12	1:41 a. m.	22.5	SW 2	8	8	0	Few Ci., Few Cu.
12	2:49 p. m.	24.4	SW 3	8	8	0	4 Cu.
13	4:37 a. m.	17.8	W 4	8	8	0	Few Ci.
13[2]	3:13 a. m.	21.0	W 3	8	8	0	Few Ci.
13	3:01 a. m.	21.0	W 3	8	8	0	Few Ci.
13	0:24 a. m.	23.2	W 5	8	8	0	Few Ci., Few Cu.
13	3:54 p. m.	25.7	WSW 3	9	8	------	Few Cu.
15	3:52 a. m.	20.3	NW 3	8	8	0	Few Cu.
15	0:29 p.m.	23.1	NNE 2	8	8	1	4 Cu.
16	3:53 a. m.	18.4	ENE 3	9	8	1	Few Ci.
16	1:52 a. m.	20.3	E 3	9	8	0	Few Ci.
16[2]	1:45 a. m.	20.4	E 3	9	8	0	Few Ci.
16	1:07 p. m.	23.2	E 2	9	8	0	2 Ci.
17	0:44 a. m.	21.7	E 2	8	8	1	2 Ci.
17	1:10 p. m.	22.8	SE 2	8	8	1	1 Ci., Few Cu.
23	4:14 p. m.	21.2	SE 1	9	8	0	8 Ci., Few Ac., Few Cu.
24	4:26 a. m.	18.9	NNE 2	6	7	2	Few Ci.
24[2]	3:21 a. m.	21.0	N 2	6	7	2	Few Ci.
24	2:58 a. m.	21.1	NE 3	6	7	2	Few Ci.
24	0:24 p. m.	21.9	NE 3	9	7	0	Few Ci., Few Cu.
24	2:28 p. m.	21.9	NE 3	9	7	0	Few Ci., Few Cu.
24	4:23 p. m.	21.7	NE 3	9	7	0	Few Ci., Few Cu.
29	3:55 p. m.	19.3	NE 3	4	8	0	2 Ci., Few Cu.

[1] Haze—0 Light; 1 Moderate; 2 Dense.
[2] Indicates Smithsonian Observation.

AREAS OF SUNSPOTS MEASURED AT MOUNT WILSON OBSERVATORY

By SETH B. NICHOLSON

[Mount Wilson Observatory, Carnegie Institution of Washington, July 1937]

The areas and positions of sun spots have been published monthly since January 1927 by the U. S. Naval Observatory in the MONTHLY WEATHER REVIEW. The Mount Wilson Observatory of the Carnegie Institution of Washington has cooperated in this program by measuring on the sketches made at the 150-foot tower telescope[1] the areas and positions of sunspots on the days requested by the Naval Observatory. It was early recognized that a large systematic difference existed between the areas so determined and those measured by the Greenwich Observatory, and in 1927 it was found that the areas given in the MONTHLY WEATHER REVIEW had to be increased by 41 percent to eliminate the systematic differences between them and the Greenwich measures.[2] The areas obtained at the Mount Wilson Observatory were apparently in close agreement with those from the Naval Observatory, although very different methods and equipment were used at the two observatories.

The publication of a note in the MONTHLY WEATHER REVIEW for February 1937 to the effect that the areas obtained at the Naval Observatory prior to 1937 should be multiplied by a factor of 1.5708 lead to an investigation of the large systematic differences between the areas determined from visual observations and those obtained from photographs.

Our drawings of sunspots have been made by several different observers, and with one exception all have drawn the spots consistently smaller than shown on photographs; no significant systematic errors were made in their measurement. Areas measured from photographs taken at Mount Wilson agree very closely with those measured at Greenwich, and photographs made with both yellow and blue light give essentially the same areas.

[1] MONTHLY WEATHER REVIEW, *55*, 85, 1927.
[2] Publications of the Astronomical Society of the Pacific, *41*, 277, 1929.

TABLE 1

Year	G./Mt.W.	Weight	G./N.	Weight
1927	1.33	6	0.88	47
1928	1.28	10	.86	71
1929	1.37	9	.88	61
1930	1.47	4	.91	16
1931	1.20	3	1.02	13
1932	1.09	1	.77	8
1933	1.29	1	.87	4
1934	1.19	1	1.18	5
Mean	1.31	----------	.89	----------

The mean factors by which the areas measured on the Mount Wilson drawings have to be multiplied to reduce them to the areas measured on photographs at Greenwich are given for each year in the second column of table 1. The factor to reduce the corrected Naval Observatory measures to the Greenwich scale are in the fourth column. The factor necessary to reduce the Mount Wilson areas to those of the Naval Observatory could not be determined directly, since measurements were made at Mount Wilson only on days for which photographs were lacking at the Naval Observatory. A comparison of both Naval and Mount Wilson Observatories with the Greenwich Observatory indicates that the Mount Wilson areas as published should be multiplied by 0.94 to reduce them to the published areas from the Naval Observatory prior to January 1937 and by 1.48 to reduce them to the corrected areas from the Naval Observatory. The weights in table 1 are proportional to the total areas.

The reason for such a large systematic difference between drawings and photographs probably lies in the fact that the contrast between photosphere and penumbra is reduced on the sketches and increased on the photographs.

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.), Superintendent, U. S. Naval Observatory. Data furnished by the U. S. Naval Observatory in cooperation with Harvard and Mount Wilson Observatories. The difference in longitude is measured from the central meridian positive west. The north latitude is positive. Areas are corrected for foreshortening and are expressed in millionths of the sun's visible hemisphere. The total area for each day includes spots and groups]

Date	Eastern standard time	Heliographic			Area		Total area for each day	Observatory
		Diff. in longitude	Longitude	Latitude	Spot	Group		
1937	h. m.	°	°	°				
June 1	11 46	−42.0	349.2	+12.0	-------	776	---------	U. S. Naval.
		+2.0	33.2	−17.0	-------	6	---------	
		+23.0	54.2	+17.0	-------	388	---------	
		+28.0	59.2	+11.0	-------	145	---------	
		+73.0	104.2	+11.0	-------	582	---------	
		+75.0	106.2	+12.0	-------	145	---------	
		+86.0	117.2	−20.0	388	---------	2,430	
June 2	10 57	−82.0	296.4	+10.5	-------	242	---------	Do.
		−69.0	309.4	+9.0	-------	24	---------	
		−29.0	349.4	+12.5	-------	921	---------	
		+12.5	30.9	−18.0	-------	48	---------	
		+36.0	54.4	+17.5	-------	242	---------	
		+41.0	59.4	+13.0	-------	242	1,719	
June 3	14 43	−83.0	280.1	−17.0	194	---------	---------	Do.
		−78.0	285.1	+10.5	-------	242	---------	
		−69.0	294.1	+10.5	-------	339	---------	
		−32.0	331.1	+10.0	-------	24	---------	
		−15.0	348.1	+13.0	-------	1,067	---------	
		+29.0	32.1	−17.0	-------	48	---------	
		+49.5	52.6	+17.5	-------	97	---------	
		+57.0	60.1	+14.5	-------	218	2,229	
June 4	11 5	−70.0	281.9	−16.0	194	---------	---------	Do.
		−64.0	287.9	+11.0	-------	242	---------	
		−56.0	295.9	+11.0	-------	388	---------	
		−40.0	311.9	+10.5	-------	73	---------	
		−11.0	340.9	+9.0	-------	12	---------	
		−2.0	349.9	+13.0	-------	1,067	---------	
		+11.0	2.9	−32.0	-------	24	---------	
		+16.0	7.9	+6.0	-------	12	---------	
		†+40.0	31.9	−17.0	-------	36	---------	
		+65.0	56.9	+17.0	-------	48	---------	
		+74.0	65.9	+14.5	194	---------	2,290	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	h. m.	°	°	°				
June 5	11 4	−57.0	281.7	−16.0	194			U. S. Naval.
		−50.0	288.7	+11.0		170		
		−42.0	296.7	+10.0		388		
		−26.0	312.7	+10.5		97		
		+2.0	340.7	+9.0	6			
		+11.0	349.7	+12.0		970		
		+21.0	359.7	−32.0		36		
		+30.0	8.7	+6.0		16		
		+52.0	30.7	−18.0		36	1,913	
June 6	12 19	−43.0	281.7	−16.5	194			Do.
		−36.5	288.2	+11.0		170		
		−29.0	295.7	+10.0		388		
		−12.0	312.7	+10.0		48		
		+25.0	349.7	+12.0		776		
		+38.0	2.7	−32.0		48		
		+67.0	31.7	−17.5		145	1,769	
June 7	11 11	−30.0	282.1	−16.5	194			Do.
		−23.0	289.1	+11.0		97		
		−16.0	296.1	+10.0		388		
		−6.0	306.1	−13.0		24		
		−5.0	307.1	−7.0		12		
		+1.0	313.1	+10.0	6			
		+29.0	341.1	+9.0		12		
		+38.0	350.1	+12.0		727		
		+51.0	3.1	−33.0		121		
		+81.0	33.1	−17.5		145	1,726	
June 8	11 2	−17.5	281.5	−16.5	145			Do.
		−10.5	288.5	+11.0		73		
		−3.0	296.0	+10.0		339		
		+50.0	349.0	+13.0		630		
		+63.0	2.0	−33.5		97	1,284	
June 9	11 4	−86.0	199.7	+19.0	97			Do.
		−85.0	200.7	−15.0	97			
		−79.0	206.7	+10.0	485			
		−4.5	281.2	−17.0	194			
		+7.0	292.7	+11.0		339		
		+12.0	297.7	+8.0		48		
		+64.0	349.7	+13.0		630	1,890	
June 10	14 25	−73.0	197.7	+20.5		679		Do.
		−71.0	199.7	−16.0		873		
		−65.0	205.7	+10.0	485			
		−19.0	251.7	+19.5		48		
		+10.5	281.2	−15.0		97		
		+22.0	292.7	+12.0		291		
		+30.0	300.7	+9.0		12		
		+37.0	307.7	−7.0	6			
		+77.0	347.7	+14.0		582	3,073	
June 11	13 30	−70.0	187.9	+21.0		242		Do.
		−60.0	197.9	+20.5		679		
		−59.0	198.9	−16.5		727		
		−51.0	206.9	+9.5	485			
		−7.0	250.9	+19.5		121		
		+3.0	260.9	+21.0		24		
		+24.0	281.9	−16.0		73		
		+35.0	292.9	+13.0		339	2,690	
June 12	11 42	−68.0	177.7	+16.0	6			Do.
		−58.0	187.7	−17.0		145		
		−56.0	189.7	+21.0		242		
		−48.0	197.7	+21.0		630		
		−46.0	199.7	−17.0		679		
		−39.0	206.7	+10.0		679		
		−24.0	221.7	+14.0		24		
		+7.0	252.7	+20.0		97		
		+17.0	262.7	+21.0		242		
		+36.5	282.2	−17.0	24			
		+48.0	293.7	+13.0		339	3,107	
June 13	13 8	−73.0	158.6	+8.0		12		Do.
		−62.0	169.6	+8.0		12		
		−62.0	169.6	−16.0		24		
		−53.0	178.6	+17.0	6			Do.
		−43.0	188.6	−17.0		582		
		−43.0	188.6	+21.0		242		
		−33.0	198.6	+21.0		630		
		−32.0	199.6	−16.0		533		
		−25.0	206.6	+10.0		727		
		+20.0	251.6	+20.0		73		
		+30.0	261.6	+31.0		194		
		+49.0	280.6	−16.0		48		
		+62.0	293.6	+13.0		291	3,374	
June 14	11 3	−88.0	131.6	+10.0	121			Do.
		−62.0	157.6	+8.0		6		
		−50.0	169.6	+8.0		6		
		−48.0	171.6	−16.5		145		
		−41.0	178.6	+15.5	16			
		−35.0	184.6	−19.0		485		
		−31.0	188.6	+20.0		145		
		−29.0	190.6	−16.0		582		
		−22.0	197.6	+21.0		582		
		−15.0	204.6	−15.5		194		
		−12.0	207.6	+9.5	630			
		+13.0	232.6	+34.0		48		
		+30.0	249.6	+20.0		48		
		+43.0	262.6	+21.0		194		
		+75.0	294.6	+13.0	218		3,420	
June 15	11 15	−75.0	131.2	+10.5	485			Do.
		−36.0	170.2	+8.0	12			
		−33.0	173.2	−16.0		242		
		−28.5	177.7	+16.0	16			
		−22.0	184.2	−19.0		388		
		−18.0	188.2	+21.0		97		
		−15.0	191.2	−16.0		727		
		−8.0	198.2	+21.0		582		
		−3.0	203.2	−15.0		194		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	h. m.	°	°	°				
June 15		+1.5	207.7	+10.0		630		U. S. Naval.
		+26.0	232.2	+35.0	24			
		+55.0	261.2	+21.0		242	3,639	
June 16	11 0	−83.0	110.1	−22.0	242			Do.
		−79.0	114.1	+11.0	145			
		−59.0	134.1	+11.0	679			
		−19.0	174.1	−16.0		291		
		−15.0	178.1	+17.0	12			
		−13.0	180.1	+10.0	6			
		−9.5	183.6	−19.0		388		
		−5.0	188.1	+21.0		48		
		−1.0	192.1	−15.5		727		
		+7.0	201.1	+21.0		436		
		+10.0	203.1	−15.0		194		
		+14.0	207.1	+10.0		630		
		+37.0	230.1	+34.0		36		
		+70.0	263.1	+20.0		170	4,004	
June 17	14 40	−68.0	109.9	+11.0		291		Do.
		−68.0	109.9	−23.0	194			
		−44.0	133.9	+11.0		291		
		−4.0	173.9	−15.0		582		
		−1.0	176.9	+16.0	24			
		+1.0	178.9	+10.0	24			
		+6.0	183.9	−19.0		436		
		+12.0	189.9	−14.0		970		
		+21.0	198.9	+21.0		339		
		+24.0	201.9	−15.0		242		
		+30.0	207.9	+10.0		533	3,926	
June 18	12 17	−60.0	105.9	+10.0	97			
		−55.0	110.9	−23.0	339			
		−52.0	113.9	+11.5		339		
		−31.0	134.9	+11.0		727		
		−2.0	163.9	+27.0		24		
		−1.0	164.9	+18.0	24			
		+10.0	175.9	−15.0		485		
		+14.0	179.9	+10.0	12			
		+19.0	184.9	−19.0		339		
		+25.0	190.9	+14.0		970		
		+32.0	197.9	+21.0		339		
		+38.0	203.9	−15.0		242		
		+42.0	207.9	+10.5		533	4,470	
June 19	10 32	−51.0	102.7	−12.0	12			Do.
		−48.0	105.7	+9.5	97			
		−42.0	111.7	−22.5	291			
		−40.0	113.7	+11.0		145		
		−20.0	133.7	+11.0		582		
		+12.0	165.7	+27.0		48		
		+23.0	176.7	−15.0		388		
		+27.0	180.7	+10.0		73		
		+30.0	183.7	−19.0		242		
		+37.0	190.7	−14.0		970		
		+45.0	198.7	+21.0		339		
		+49.0	202.7	−15.0		194		
		+55.0	208.7	+10.0		485	3,866	
June 20	10 48	−35.0	105.3	+10.0		97		Mt. Wilson.
		−31.0	109.3	−22.0	291			
		−29.0	111.3	+11.0		145		
		−7.0	133.3	+12.0		533		
		+27.0	167.3	+27.0		121		
		+37.0	177.3	−16.0		533		
		+41.0	181.3	+10.0		242		
		+45.0	185.3	−20.0		194		
		+50.0	190.3	−15.0		824		
		+61.0	201.3	+20.0		388		
		+69.0	209.3	−16.0		194		
		+71.0	211.3	+9.5		727	4,289	
June 21	11 47	−72.0	54.5	−11.0		291		U. S. Naval.
		−19.0	107.5	+9.0		145		
		−16.5	110.0	−22.0	267			
		−12.0	114.5	+10.0		97		
		+9.0	135.5	−10.0		48		
		+9.0	135.5	+12.0		485		
		+39.0	165.5	+28.0		97		
		+50.0	176.5	−14.0		436		
		+55.0	181.5	+11.0		388		
		+58.0	184.5	−19.0	145			
		+65.0	191.5	−14.0		727		
		+72.0	198.5	+21.0		242		
		+78.0	204.5	−14.0	97			
		+85.0	211.5	+10.0	388		3,853	
June 22	11 2	−75.0	38.7	−18.5		339		Do.
		−60.0	53.7	−12.0		582		
		−15.0	98.7	−13.0		12		
		−7.0	106.7	+9.0		73		
		−4.5	109.2	−22.0	242			
		0.0	113.7	+10.5	97			
		+21.5	135.2	−10.0		97		
		+22.5	136.2	+13.0		582		
		+46.0	159.7	+31.5	12			
		+52.0	165.7	+29.0		97		
		+65.0	178.7	−14.0		582		
		+67.0	180.7	−10.0		388		
		+69.0	182.7	−19.0	145			
		+85.0	198.7	−13.0		339		
		+85.0	198.7	+22.0	97		3,684	
June 23	11 18	−60.0	40.3	−18.5		242		Do.
		−46.0	54.3	−12.5		727		
		0.0	100.3	−13.0		48		
		+7.0	107.3	+9.0		48		
		+9.0	109.3	−23.0	242			
		+12.5	112.8	+10.5	73			
		+20.0	120.3	+21.0		36		
		+35.0	135.3	+13.0		582		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	h. m.	°	°	°				
June 23		+38.0	138.3	−10.0	24			U. S. Naval.
		+66.0	166.3	+28.0		97		
		+76.0	176.3	+9.0	194			
		+85.0	185.3	−13.0	582		2,895	
June 24	11 5	−78.0	9.2	+18.0		194		Do.
		−48.0	39.2	−18.5		291		
		−32.0	55.2	−12.5		824		
		−14.0	73.2	+21.0		24		
		−3.0	84.2	+8.0	12			
		+20.5	107.7	−23.0	242			
		+26.0	113.2	+10.0	73			
		+33.0	120.2	+21.0		97		
		+49.0	136.2	+12.0		533		
		+80.0	167.2	+26.0	48		2,338	
June 25	11 14	−62.0	11.9	+19.0		121		Do.
		−35.0	38.9	−18.0	291			
		−19.0	54.9	−12.0		824		
		+33.0	106.9	−23.0	206			
		+39.0	112.9	+10.0	73			
		+44.0	117.9	+21.0		145		
		+62.0	135.9	+13.0		339	1,999	
June 26	10 52	−51.0	9.8	+10.5		48		Do.
		−49.0	11.8	+19.0		97		
		−21.5	39.3	+7.0		24		
		−21.0	39.8	−17.0	194			
		−6.0	54.8	−12.0		582		
		+47.0	107.8	−23.0	194			
		+50.0	110.8	+10.5		73		
		+59.0	119.8	+21.0		194		
		+78.0	138.8	+12.0	242		1,648	
June 27	9 9	−40.5	8.0	+19.0		97		Mt. Wilson.
		−9.5	39.0	+8.0		97		
		−9.0	39.5	−17.0	242			
		+8.0	56.5	−11.0		485		
		+62.0	110.5	−23.0	194			
		+68.0	116.5	+11.0		145		
		+86.0	134.5	+22.0	242		1,502	
June 28	11 11	+3.0	37.2	−17.0		242		U. S. Naval.
		+5.0	39.2	+9.0	16			
		+21.0	55.2	−11.0		485		
		+74.0	108.2	−23.0	194		937	
June 29	11 4	−61.0	320.0	−9.0		24		Do.
		−30.0	351.0	+15.0		73		
		−11.0	10.0	+19.0		48		
		−3.0	18.0	+18.0		48		
		+18.0	39.0	−17.0		194		
		+36.0	57.0	−11.0		218	605	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
June 30	10 51	−78.0	289.9	+14.0	97			U. S. Naval.
		−45.5	322.4	−10.0	12			
		−17.0	350.9	+15.0		291		
		+1.0	8.9	+18.0		48		
		+10.0	17.9	+17.0		145		
		+31.0	38.9	−18.0		194		
		+48.0	55.9	−10.0		242	1,029	

Mean daily area for 30 days, 2,587.

PROVISIONAL SUN-SPOT RELATIVE NUMBERS, JUNE 1937

[Dependent along on observations at Zurich and its station at Arosa]

[Furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich, Switzerland]

June 1937	Relative numbers	June 1937	Relative numbers	June 1937	Relative numbers
1	*Mc* 79	11	96	21	*d* 186
2	*d* 89	12	*MEacc* 134	22	*ad* 199
3	92	13	*Ec* 166	23	*Mac* 163
4	*bd* 116	14	185	24	133
5	*Wc* 128	15	*ad* 191	25	108
6	121	16	*Mabcd* 174	26	116
7	102	17	*b* 190	27	*b* 91
8	*a* 64	18	*a* 194	28	*a* 80
9	*Ecd* 73	19	185	29	*Ec* 80
10	*add* 98	20	*a* 183	30	93

Mean, 30 days =130.3.

a= Passage of an average-sized group through the central meridian.
b= Passage of a large group or spot through the central meridian.
c= New formation of a group developing into a middle-sized or large center of activity; *E*: on the eastern part of the sun's disc, *W*: on the western part, *M*: in the central circle zone.
d= Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. LITTLE, *In Charge*]

By LOYD A. STEVENS

Mean free-air data, based on airplane weather observations during the month of June 1937, are given in tables 1 to 3.

The mean surface temperatures for June (see chart I) were slightly above normal over the greater portion of the country.

The mean free-air temperatures were, for the most part, near normal at all levels. The most consistent negative departures occurred along the Atlantic Coast, where at 5 kilometers departures of minus 2.3° C. and minus 2.5° C. were recorded at Norfolk and Lakehurst, respectively. At Cheyenne negative departures persisted at all levels and at Omaha, also, pronounced negative departures occurred up to 3 kilometers amounting to minus 2.3° C. at 1 kilometer. The greatest positive temperature departure occurred at Seattle, amounting to plus 2.1° C. at 1.5 kilometers. In general the mean free-air temperatures for June averaged from 3° to 4° C. higher at all levels than in May.

The mean free-air relative humidities were above normal at most stations but were below normal at San Antonio up to 2 kilometers (minus 7 percent at 1 and 1.5 kilometers) and at Seattle between 1 and 4 kilometers (minus 9 percent at 2 and 2.5 kilometers). The greatest positive departure (plus 11 percent) occurred at Omaha at all levels between 1 and 2.5 kilometers.

Monthly mean free-air barometric pressures and equivalent potential temperatures are shown in table 3. In general there was an increase in the average pressure, of June over May, of 1 to 2 mb. in the lower levels and of 3 to 5 mb. in the upper levels. The increase was most pronounced at 5 kilometers. The mean isobaric charts as drawn from the values in table 3, were characterized in the lower levels by relatively high pressure over the southeast and extreme northwest portions of the country and a trough of low pressure extending in a NE.–SW. direction across the central part of the country. The mean isobars shifted with altitude, however, and assumed approximately a W.–E. direction across the country above 3 kilometers. In the higher levels a low pressure center was located over Fargo and Sault Ste. Marie. The highest mean pressure was recorded at San Antonio at all levels. Changes in the mean pressure gradient from May to June were relatively unimportant except that there was, in general, decrease in gradient with latitude over the eastern part of the country in the higher levels.

Free-air resultant winds, based on pilot balloon observations made near 5 a. m. (75th meridian time), are shown in table 4. Along the Pacific coast from Oakland northward the resultant winds varied from the normal in a counterclockwise direction (i. e. toward the south) below 3 kilometers. The greatest variation occurred at